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Specification and Drawings, as originally filed, with Application for Patent Serial No:
2,393,619, on July 17, 2002, by KIM ANDREW LEBLANC, for "Collapsible Loading
Ramp".

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COLLAPSIBLE LOADING RAMP

FIELD OF THE INVENTION

- 5 This invention relates to a collapsible loading ramp suitable for use on the bed of a pick-up truck or a raised ledge.

BACKGROUND

- 10 Collapsible ramps provide a dual benefit. Firstly they provide a means of bridging the gap between a horizontal raised surface and the ground so that an object or vehicle can be moved along said ramp and be loaded on to the raised surface. Secondly, they can be folded or slideably compacted into themselves so as to allow for easy storage. The prior art includes several collapsible ramps that fixedly attach to a raised surface,
15 most commonly the tailgate of a truck.

Examples of prior art collapsible loading ramps are shown in Floe U.S. Pat. Nos. 5,538,308, Curtis 3,713,553 and Adaway 4,864,673 et al.

- 20 Floe discloses a portable ramp structure constructed by a plurality of pairs of support members having longitudinal channels for mounting a predetermined number of cross members therebetween. Retention chains with associated hooks removably attach the ramp structure to a transport vehicle.
- 25 Curtis teaches a loading ramp that secures to a vertically swingable truck tail gate by mounting rackets. The ramp includes two sections hinged together to allow the ramp to fold so it can be stored in a compact form against the tailgate.

- Adaway discloses a collapsible ramp comprising an attachment frame, a foldable
30 support structure mounted to the attachment frame by pivotable hinges and a telescoping deck structure of interconnected, essentially rectangular plates. The foldable support structure has longitudinal support members with foldable joints

intermediate along the lengths of the members, and these members are pivotally connected to the hinge. The support members fold back on themselves to reduce the ramp to a collapsed state for storage purposes.

5 SUMMARY OF THE INVENTION

The present invention provides a collapsible loading ramp which can be unassembled into pieces that can be stored individually. In its extended form the ramp non-fixedly attaches to a raised horizontal surface.

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The ramp is a collapsible folding ramp that includes two longitudinal support rails that are fixable to the edge of a raised horizontal surface against which the ramp is to be supported. The ramp further includes a plurality of support cross members that attach between the longitudinal support rails. In particular, the side rails include
15 plurality of posts that extend upwardly therefrom and the surface panels include apertures at their side edges that engage over the posts. The panels may have several embodiments. Preferably, the panels include channels along their edges that overlie the side rails to distribute weight to the longitudinal support rails. The panel dimensions are such that they are easy to store when stacked one upon the other but
20 are large enough to minimize the number of panels that must be mounted on the rails.

The panels can be formed as rungs or alternately can have a plate surface. In one embodiment, the panels include rungs, as shown, but small plate members engage over the rungs.

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BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is one embodiment of the collapsible loading ramp shown mounted to the gate of a pickup truck.

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FIG. 2 shows the collapsible loading ramp of FIG.1 in its extended position with perpendicular panels placed over the rungs and spaced the distance of the wheels of a vehicle to be driven up the loading ramp.

5 FIG. 3 shows a front elevation view of a panel member.

FIG. 4 shows a top plan view of a panel member.

FIG. 5 shows a side view of a side rail in an extended position.

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FIG. 6 shows a side view of a side rail in a folded position.

FIG. 7. shows a side elevation view of a side rail with a foot attachment at the lower end thereof, with the side rail shown in section.

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FIG. 8 shows an elevation view of the alternate means of fixing the ramp to the raised horizontal surface by way of straps.

FIG. 9A shows an exploded view of a cross member.

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FIG. 9B shows an exploded view of another connection for a rung and side support.

FIG. 10 shows a front elevation view of an assembled rung cross member.

25 FIG. 11 shows a top plan view of an assembled rung cross member.

FIG. 12 shows a front elevation view of a carrying case for the disassembled ramp.

30 FIG. 13 shows a perspective view of the ramp pieces assembled as a box with a carrying handle.

FIG. 14 shows a front elevation view of a plate member of FIG. 13.

DETAILED DESCRIPTION

Referring now to FIG 1 there is shown a collapsible loading ramp 11 mounted to the
 5 tailgate 12 of a pickup truck 10. The ramp facilitates access to the tailgate. While a tailgate is shown, it is to be understood that the ramp can be used to provide access to any raised surface such as a porch, loading dock, etc.

The collapsible ramp 11 includes a pair of foldable longitudinal support rails 18 and cross members 26 each including rungs 27 attached in groups and extending between
 10 a pair of side supports 22. Cross-members 26 extend between the foldable longitudinal support rails and provide a surface for supporting movement over the ramp. Cross members 26 are mounted on support rails 18, such that they generally extend at right angles to the long axis of the ramp. The ramp can be mounted onto the tailgate or raised surface in any desired manner. However, preferably any mounting
 15 arrangement engages the ramp to the tailgate 12 during use to prevent the ramp from working loose. In the illustrated embodiment, a mounting mechanism 14 is used which is attached at the end of each support rail 18.

While the embodiment of FIG 1 shows the cross members formed as rungs, other cross members can be used such as solid plates or a combination thereof. For
 20 example, FIG 2 shows the collapsible loading ramp 11 with plate members 30 fit over the rungs. Plate members 30 hook over the cross members 26 in a fixed but reasonable manner so as to be secure during use but easily adjustable. In the illustrated embodiment, the plate members 30 need only be slid along a rung in order to be moved to match the spacing of the tires of any vehicle that may be loaded via
 25 the ramp 11. The plate members 30 also distribute the weight of an object being loaded evenly over a length of the rung surface. Each plate member 30 can be formed of a single length or multiple separate plate pieces, for example, an upper piece 30B and a lower piece 30A, as shown. The plate members each include a means for securing them to the cross members such as a hook, a clamp, a post or, as shown, ribs
 30 31 forming a channel engageable over a rung. Plate members 30 are bent so as to be angled at one end 29. The bent end of the plate member 29 can be upwardly

positioned so as to connect with the tailgate 12 and provide an angled leadway to the tailgate 12.

FIGs 5 and 6 show a longitudinal support rail 18 in greater detail. Longitudinal support rail 18 is formed of lower 18A and upper 18B portions foldably joined by a hinge 20, which permits the rail to be folded (FIG 6) and thereby facilitates storage. The hinge 20 is, in the illustrated embodiment, attached to the longitudinal support rail 18 by a bolted plate 38. However, other hinge arrangements can be used as desired. A safety cable 36 is secured, as by use of rivets, to the bolted plate 38 of the hinge 20. The safety cable 36 strengthens the hinged connection 20 and provides a secure connection between the upper 18B and lower 18A portions of the longitudinal support rail 18 so that the portions of the longitudinal support 18 will remain connected even in the event that the hinge breaks. A hinge secure extension 34 extends from the longitudinal support rail upper portion 18 and fits into an aperture in the longitudinal support rail lower portion 18A when said rail is extended. Extension 34 serves to maintain the portions 18A and 18B in proper alignment and to distribute the stress at the hinge over a greater area.

Releasable mounting mechanism 14 includes a mounting strap 16 extending from the end of each longitudinal support rail 18. The mounting mechanism 14, as shown, can also include a pin 14 insertable through an aperture 16a in each mounting strap 16. The releasable mounting mechanism operates by securing to a raised surface which includes apertures for accepting pins 14. In particular, the releasable mounting mechanism is operated by placing mounting straps 16 onto a raised surface, such as a tailgate or mounting ledge, and aligning apertures 16a with apertures in the raised surface. Pin 14 is then fit through the aperture 16a in the mounting strap 16 and through the aperture in the tailgate or mounting ledge. Once inserted entirely through the aligned apertures a removable cotter pin 32 already fit through an aperture in the pin 14 acts to hold the pin 14 in place. Various other mounting means can also be utilized to mount the ramp onto a tailgate or mounting edge, such as adhering a non-slip material to the base of the mounting strap 16 so that when it is placed on the tailgate 12 the ramp is supported.

FIG 2 shows another type of mounting means employing a hooked flexible strap 41 (FIG. 8), which may be attached to the mounting strap 16 by fitting the pin 14 through both an eye 40 in the hooked strap 40 and the aperture 16a in the mounting strap and affixing cotter pin 32 through pin 14. The pin 14 should be inserted through the aperture 16a in the mounting strap 16 upside down so that the end of the pin and the cotter pin point upwards and neither can damage the surface of the tailgate 12. Once attached to mounting strap 16, hooked strap 41 can be extended to secure the ramp. In particular, hooked end 42 of the strap can be engaged over an edge or around a support member and hooked onto the strap to support the ramp. In FIG 2, one strap 41 is shown with its hooked end 42 engaged over an edge of the tailgate and the other strap is attached to mounting strap 16 but not yet engaged over an anchor point.

The support rails 18 can be set at their lower end directly on the lower surface. Alternately, as shown in FIG 7, a foot attachment 43 can be mounted to the lower portion of the longitudinal support rail 18. A flat foot side panel 44 is affixed parallel to the longitudinal support rail lower portion 18b via a pin 46 which fits through an aperture in the foot side panel and an alignable aperture in the longitudinal support rail 18A. A perpendicular attachment extends from the foot side panel 44 to the foot base 48. A non-slip material 49 may be attached to the underside of the foot base 48.

For attachment of the cross members 26, longitudinal support rails include a plurality of posts 24 fixedly attached to their upper surfaces. Posts 24 are sized to fit through apertures formed on the cross members 26. Preferably, the posts 24 are sized to extend upwardly through apertures 28 but are short enough such that they do not interfere with passage over the ramp. Posts 24 are preferably angled towards to the top of the ramp so that the cross members 26, can engage them and do not easily become disengaged from the rails when engaged over the posts 24.

One embodiment of a cross member 26 is shown in exploded configuration in FIG 9 and in assembled form in FIGs 10 and 11. Cross member 26 includes a pair of side supports 22 and three rungs 27 extending there between. It is to be understood that, while three rungs are shown, any number of rungs can be used on each cross member. Side supports 22 are formed as channels sized to fit over longitudinal support rails 18.

Each side support 22 includes a form, such as an aperture 28, as shown, for securing over a post 24 on the longitudinal support rail over which it is selected to fit. As will be appreciated, the positioning, size, and number of forms on a side support 22 will be determined by the placement, spacing and size of the posts 24 on the longitudinal support rails with which the cross members are to be used.

The rungs are attached to the side supports such that they can withstand application of a desired weight, such as a small tractor, without failing. Preferably, the rungs are constructed to permit a degree of flex or pivot movement between the rungs and the side supports such that they can withstand some offset between longitudinal side rails 18 while the side supports remain firmly in engagement with the posts on the side rails.

In the illustrated embodiment, to assemble the cross members rungs 27 having hollow interiors can be used. A fixed post 62 and a post providing for pivotal attachment of the rung 50, are attached to the each inner longitudinal edge of a side support 22. Fixed posts 62 are substantially rigidly attached to side supports 22, as by a means such as welding and thereby cause the rungs to be rigidly attached to the side supports when the rungs are secured into the fixed posts. Posts 50 can be attached to the side supports 22 by a variety of means. FIG 9A shows rectangular posts 50 that are attached to a panel via a bolt 68 and secured with a nut 70, such that posts 50 can pivot about the long axis of the bolt. As such, pivotal movement is permitted, as indicated by arrows a, between the rungs and the side supports, when the rungs are mounted onto the posts. FIG 9B shows an alternative means of achieving pivotal connections between the rungs and the side supports wherein round posts 50a are fixedly attached, by a means such as welding, to the side supports 22.

Fixed posts 62 and posts 50 are sized so as to fit within the hollow interior of a rung 27. In assembly, a single rung 27 is secured with a fixed post 62 at one end and a post 50 at the other end. Fixed posts 62 and posts 50 will be positioned so as to alternate along the side support 22.

A method of attaching the rungs to the fixed and posts is shown in FIG 9A by which an aperture 64 and 52 extends through the upper and lower faces of the posts on one end of the rung and an aperture 66 and 58 extends through the upper and lower faces of the rung 27 near the opposite end of the rung 27. When the rung 27 and the posts are fit together the apertures 64 and 52 in the posts and the rung line up to form a single hole into which a bolt 54 or 57 can be inserted and locked therein by a nut 56 or 57a, so as to attach the cross member 60 to the post.

Round posts 50a as shown in FIG 9B are fitted into the open end of the rung 27. Aperture 58 in the rung 27 is aligned with a slot 55 in the post 50a so that bolt 54 is inserted into the aperture and through the slot 55 and locked by a nut 56 so as to attach the cross member to the post. Slot 55 therefore permits sliding movement of the bolt and therefore, pivotal movement of the rung relative to the side support, without a simpler arrangement than that shown in FIG 9A.

Of course, fasteners, such as rivets or pins, other than bolts 54, 57 can be used as desired.

The ramp is foldable to facilitate storage thereof. FIGs 13 and 14 show embodiments of means for storing the ramp when it is not in use. In particular, FIG 13 shows a carrying case 80 which the individual unassembled pieces of the ramp, including rails 18 and cross members 26, can be packed. The clasps 82 on the carrying case 80 keep the case closed and the handle 84 allows for easy transportation of the stored ramp. Carrying case is sized to fit all of the pieces of the ramp, with the rails folded about hinge 20 and the cross members 26 removed from posts 24 and stacked one upon the other.

FIG 14 shows, in partial exploded configuration, a stacked assembly of ramp pieces, including support rails 18, cross members 26 and panels 30 formed into a box-shaped structure for transport. In this assembly, cross members 26 are stacked one upon the other with side supports 22 aligned within the stack. Support rails 18 folded around the hinge fit between the cross members in the stack. Pins 90 are inserted through aligned apertures 28 in the stacked cross members. A lock clamp 92, or other locking

means such as a spring biased detent, is provided in association with each pin 90 to releasably lock the pins through the apertures. In this embodiment, plate members 30C are placed on the top and the bottom of the stacked cross members 26 to form a solid outer face for the box structure. Plate members 30C are formed and sized to fit
5 between side supports 22 with flanged ends 94 fitting down between adjacent rungs 27. Flanged ends 94 each include an opening 96, which can be engaged over pin 98 to secure the plates in place. A handle piece 99 can be attached to a cross member to allow the box structure to be easily transported.

In this embodiment, to facilitate use of the plate members, slots 100 are formed to
10 accommodate flanged end 94 of the adjacent plate, when the plates are mounted on the assembled ramp.

The individual pieces of the ramp when unassembled can be stored in one of the manners described or in other ways such as each piece being separate from the other pieces.

15 One person can easily collapse and extend the ramp making it possible to load or unload a self propelled machine quickly and efficiently.

While the invention has been illustrated and described in detail in the drawings and foregoing description, the same is to be considered as illustrative and not restrictive in character, it being understood that only the preferred embodiment has been shown and
20 described and that all changes and modifications that come within the spirit of the invention are desired to be protected.

What is claimed is:

1. A collapsible loading ramp comprising:
5 at least a pair of longitudinal support structures having raised posts extending
from its outer surface;
a cross-member attaching between said at least a pair of longitudinal support
structures by engaging against said posts in a non-fixed manner; and
said ramp being comprised of individual pieces which can be unattached one
10 from the other and stored separately.
2. A collapsible loading ramp as claimed in claim 1 in which said cross member
includes an aperture which can be fit over a post on the support member.
3. A collapsible loading ramp as claimed in claim 1 wherein the longitudinal
15 support structure is foldable.
4. A collapsible loading ramp as claimed in claim 3 including a safety cable
riveted to said hinge so that the cable is pulled taunt over the hinge when said
longitudinal support structure is extended.
5. A collapsible loading ramp as claimed in claim 1 which can be formed into a
20 totable package by stacking the individual pieces when said ramp is
unassembled.

ABSTRACT

A collapsible loading ramp affixable to a raised surface in a non-permanent manner extending from the raised surface to the ground. The ramp is foldable by way of a
5 hinge connecting the first ramp section to the lower ramp section. Rung units attach to the first and second ramp sections via posts and can be unattached to facilitate compact storage of the ramp pieces individually or in a compact box-like formation.

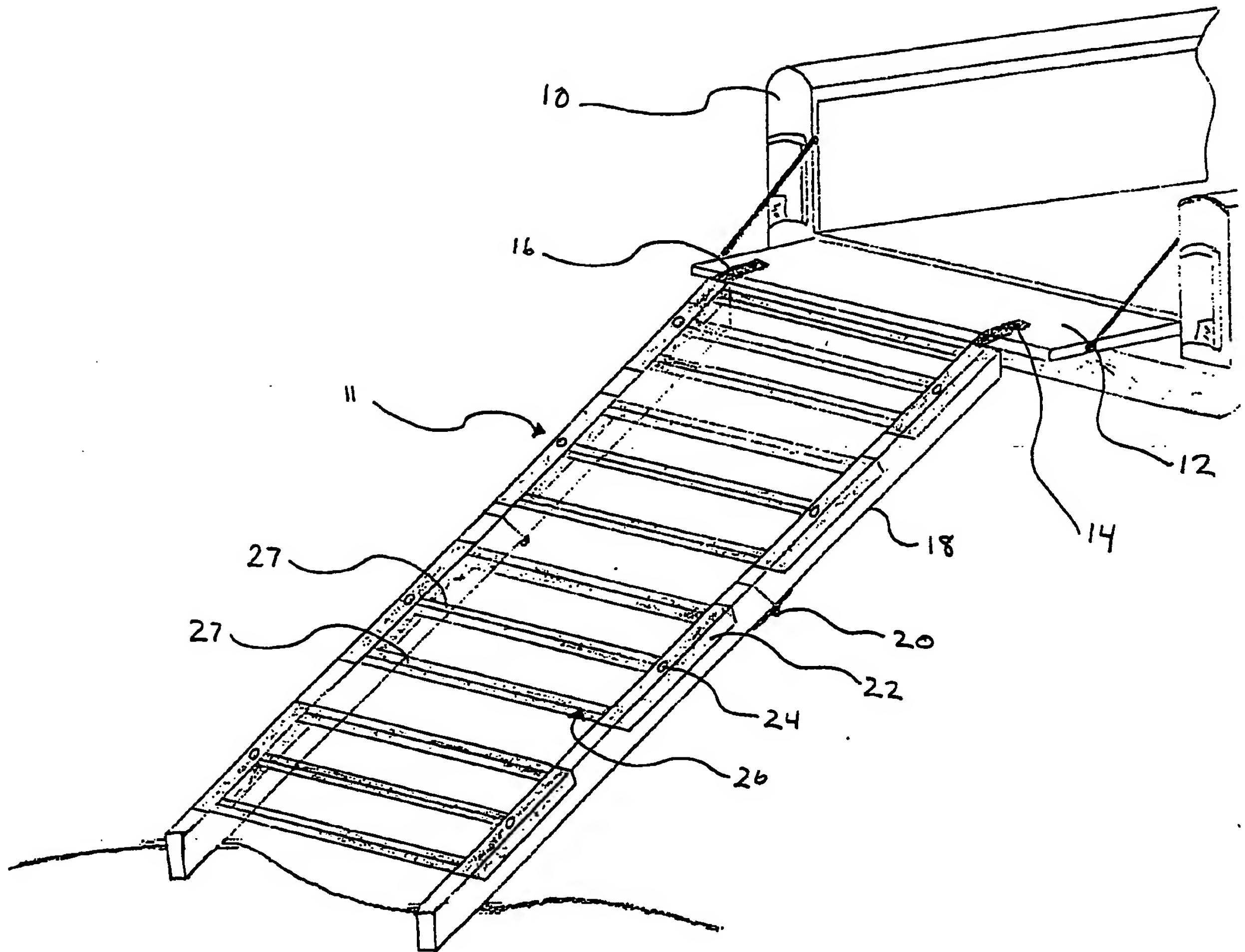


FIG 1

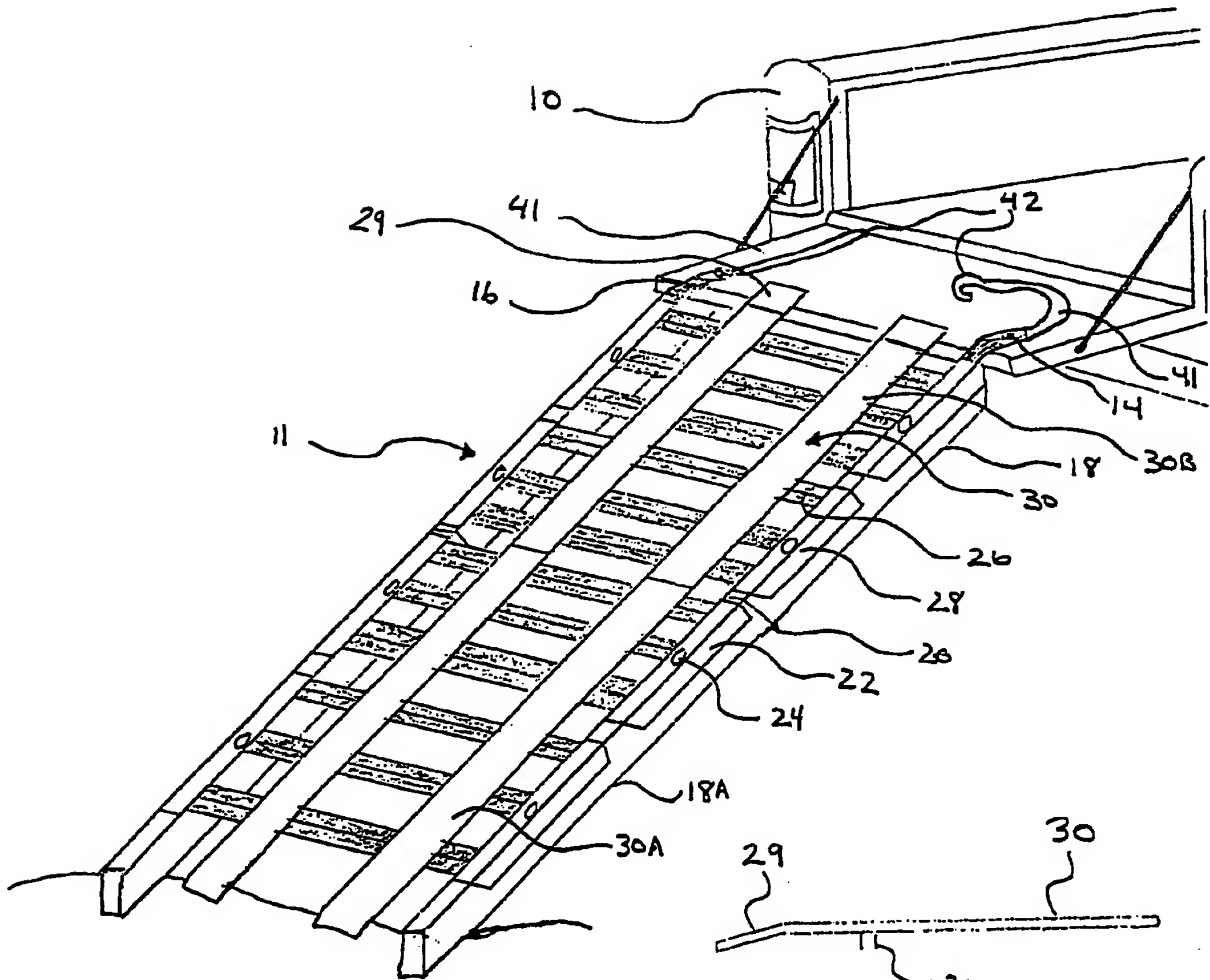


FIG 2

FIG 3

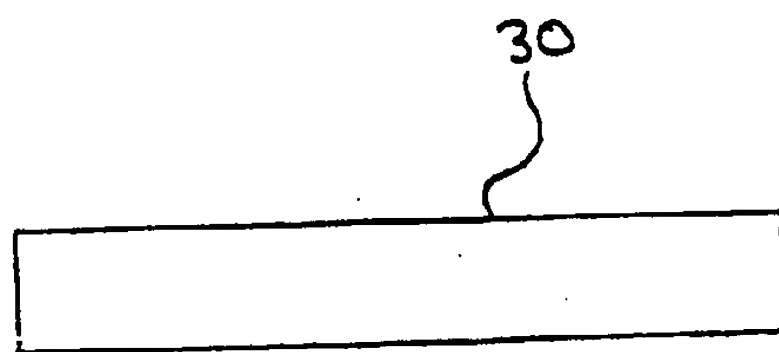
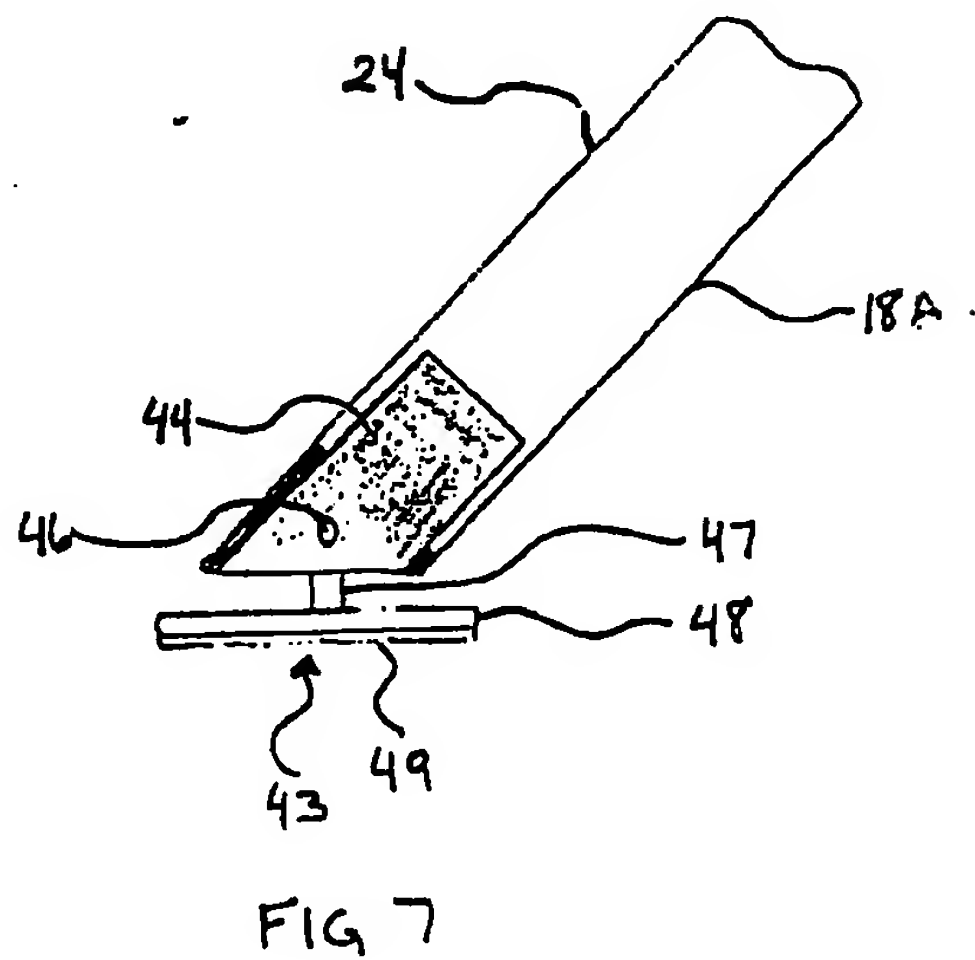
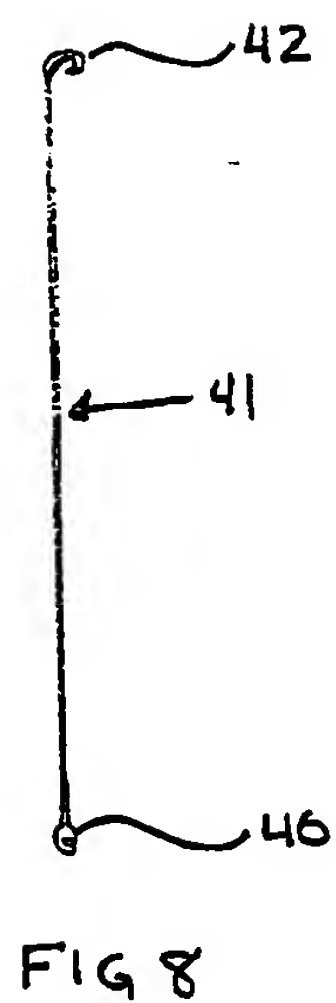
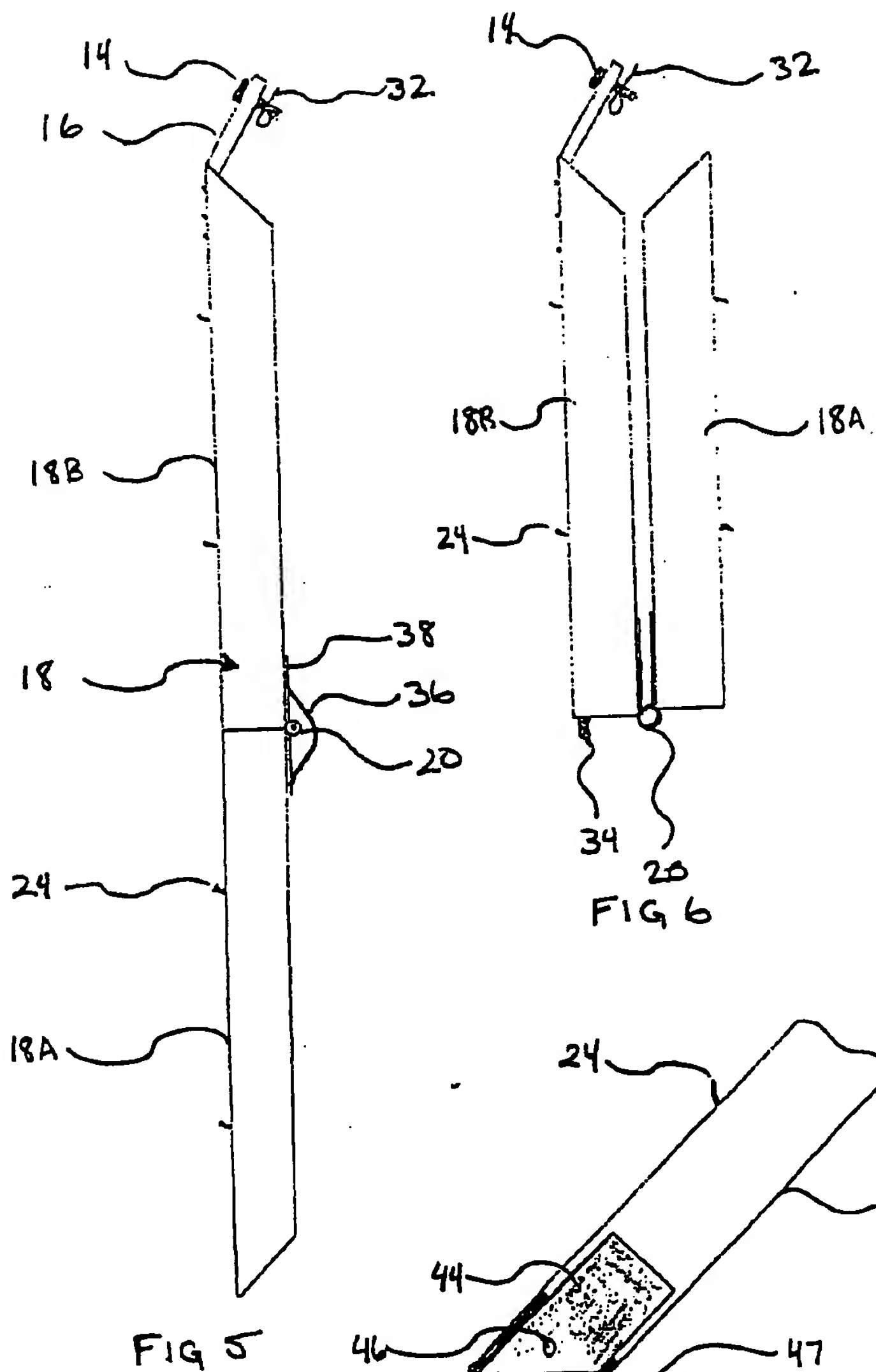


FIG 4



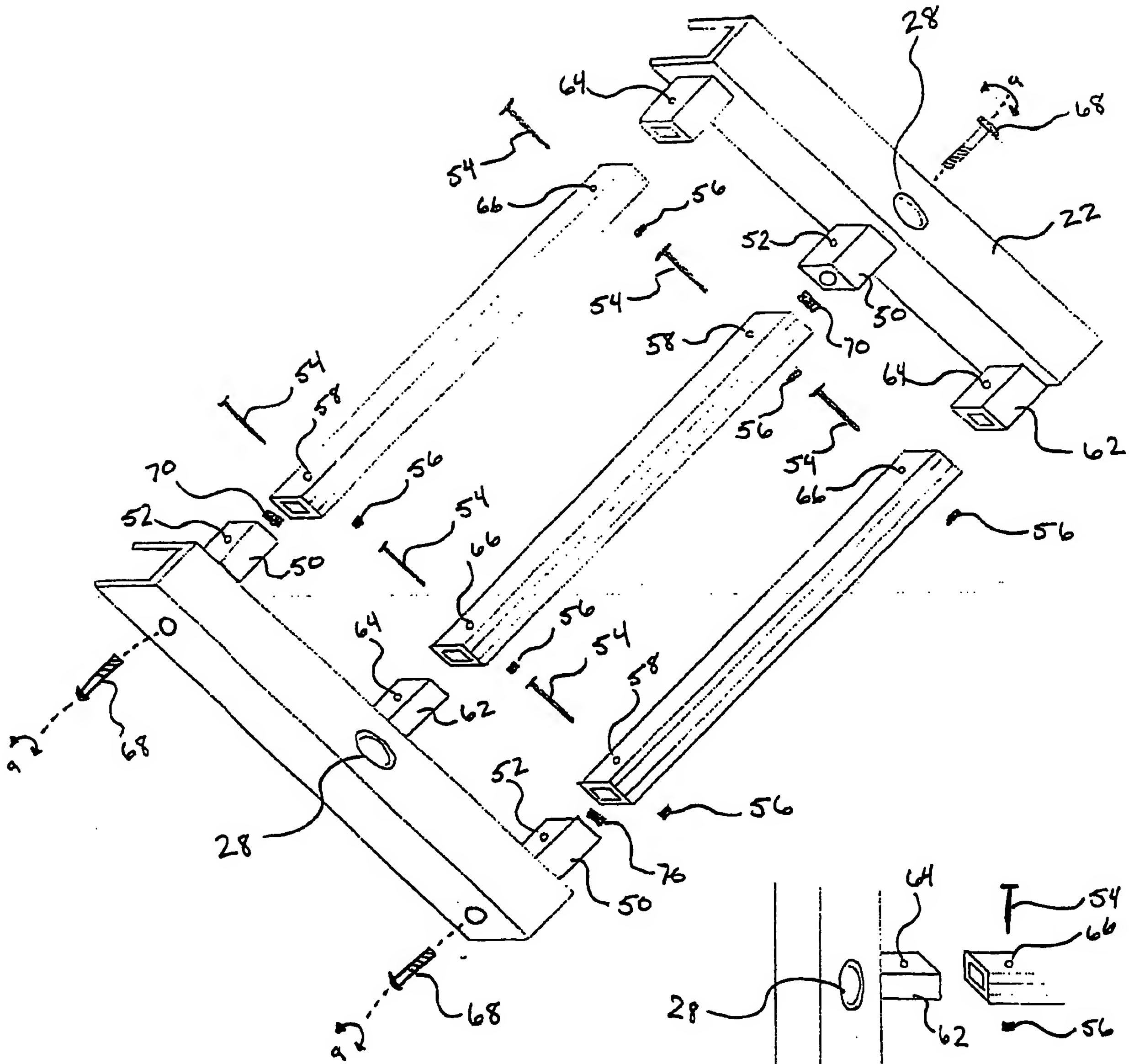


FIG 9A

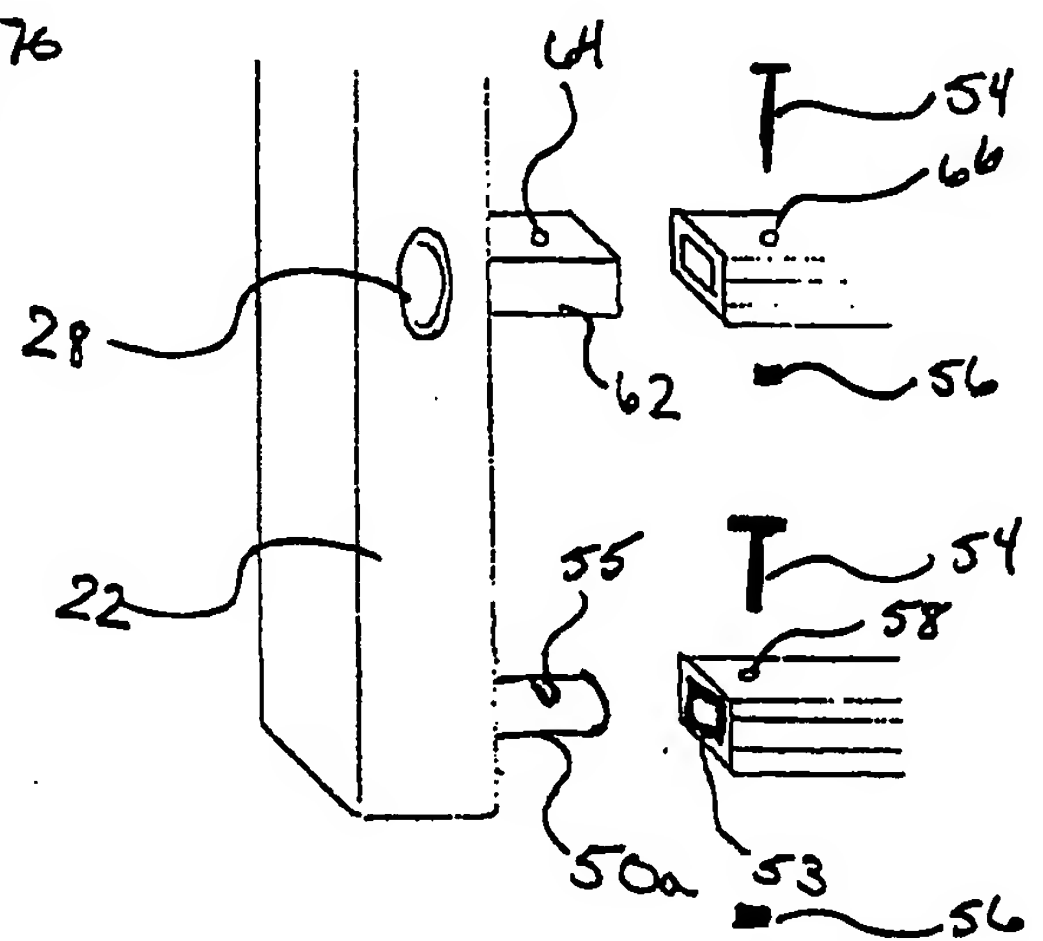
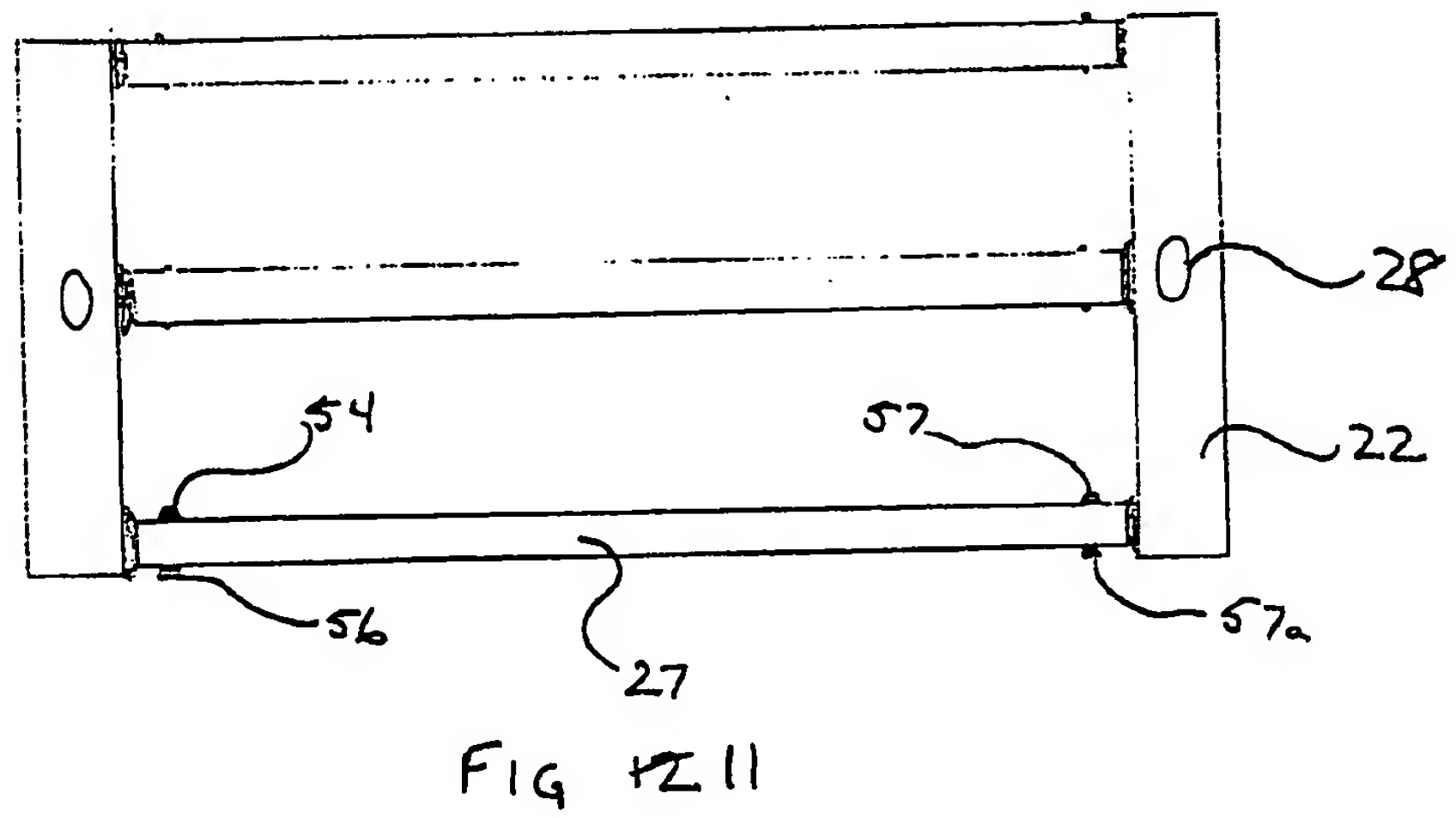
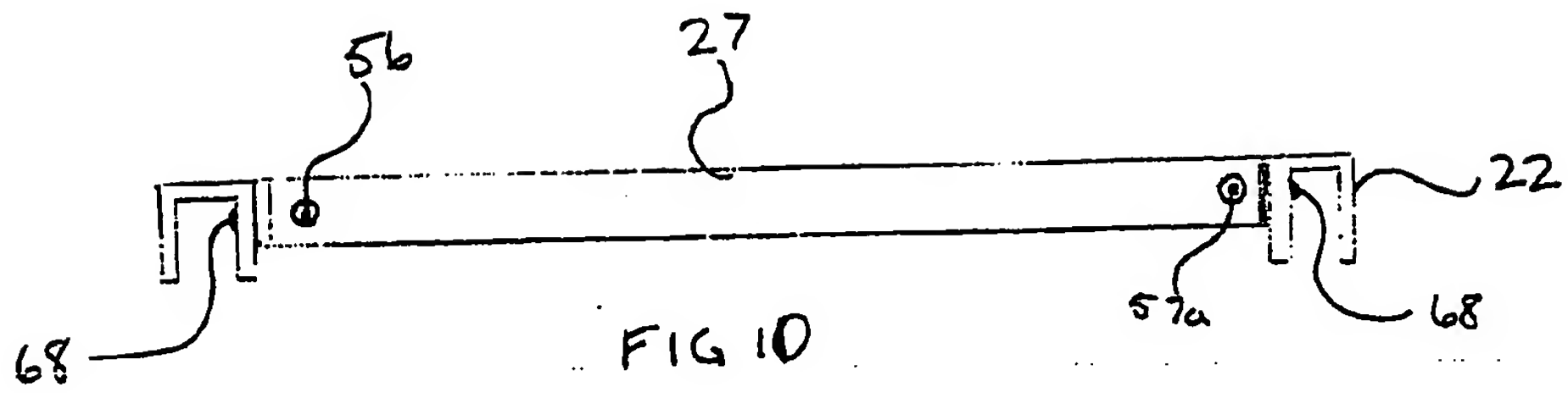
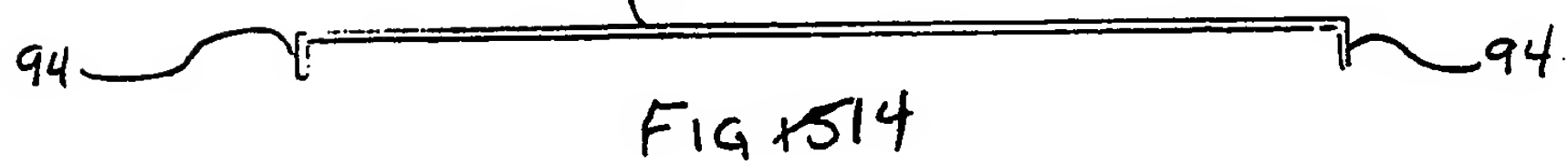
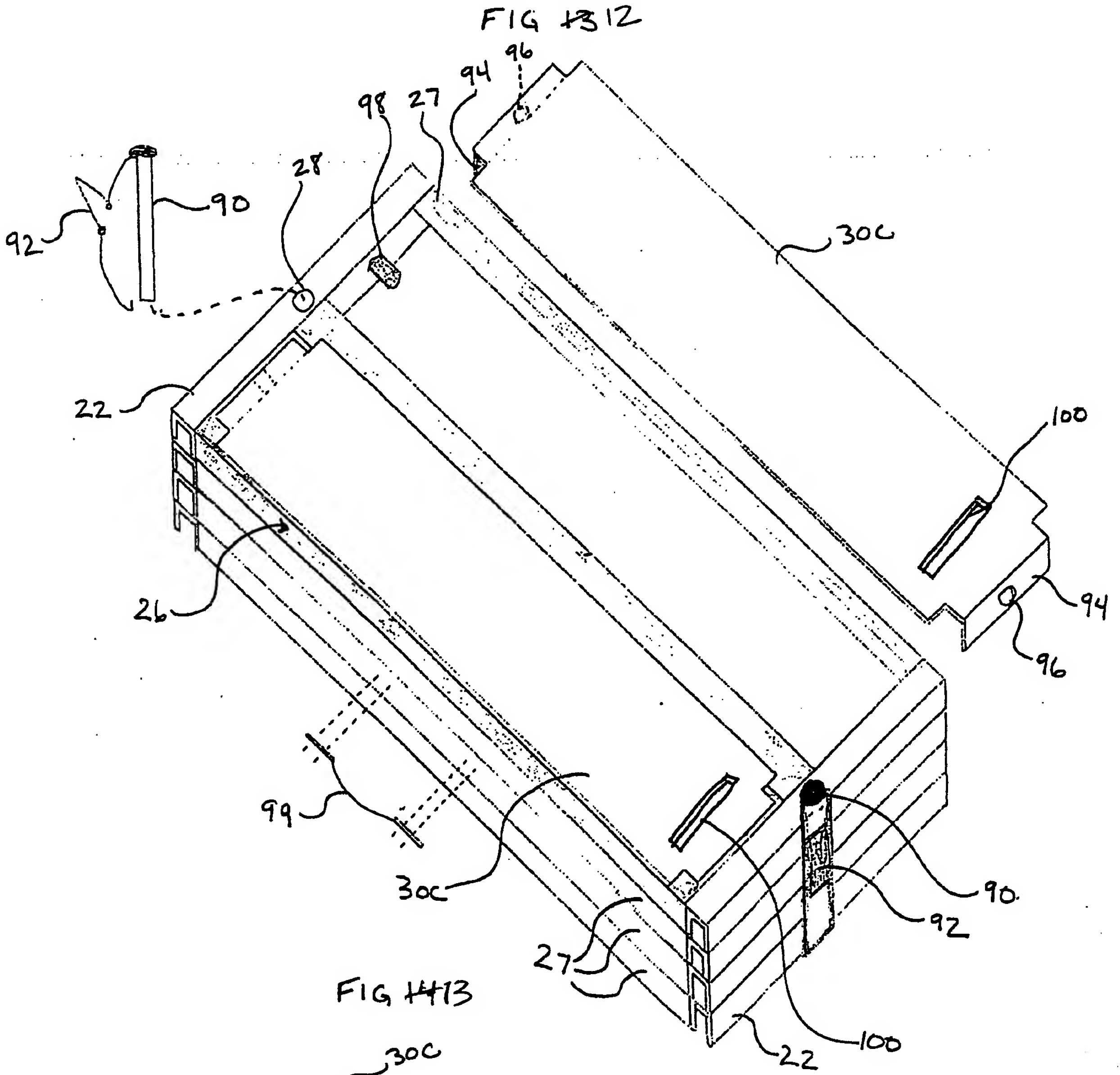
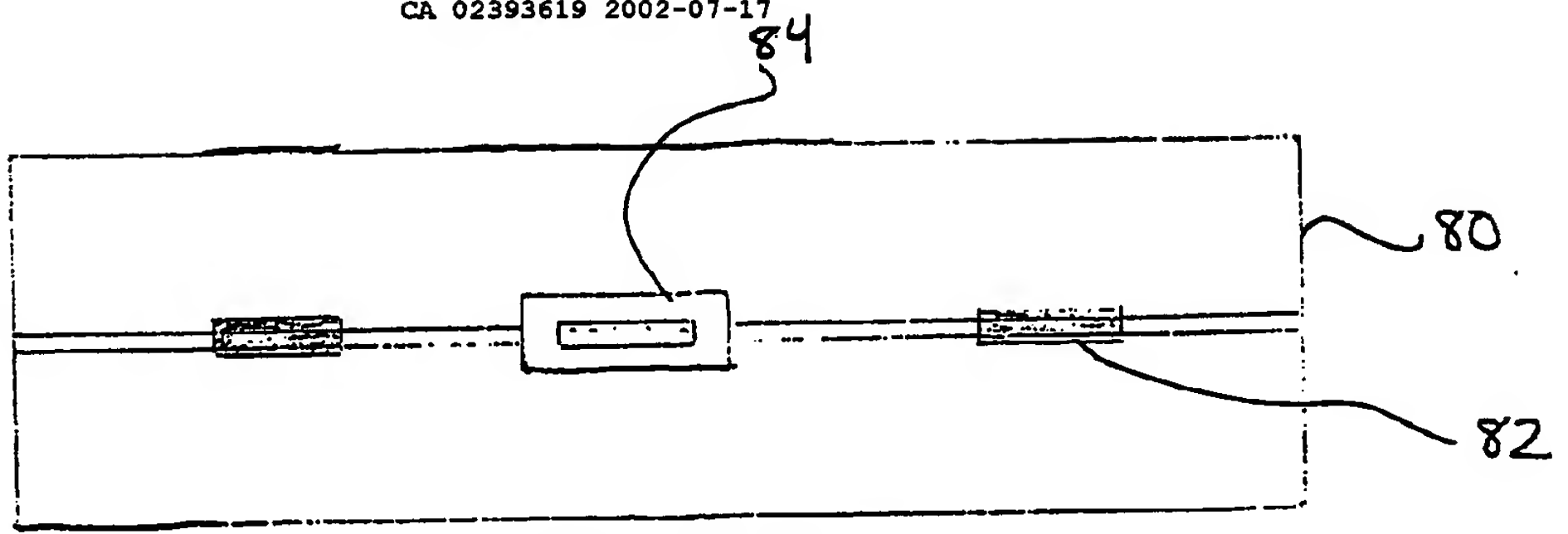


FIG 9B





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